Voice Activated Cockpit Management Systems: Voice-Flight NexGen, Phase I

Completed Technology Project (2013 - 2013)

Project Introduction

Speaking to the cockpit as a method of system management in flight can become an effective interaction method, since voice communication is very efficient. Automated Speech Recognition in general, and aided and abetted now by Southern Air Aviation's Voice Activated Cockpit Management Systems including the innovative heuristic technology Voice-Flight NexGen (VFNG) has advanced significantly in recent years and is now ideally suited to this application. VFNG is speaker-independent, achieves a word recognition rate of 98% in high noise and up to 120Db, and permits the chaining of up to four commands in a single utterance and a correction of a misspoken command in the same utterance. All of these performance requirements are met within a 2% time-slice of a 1.2GHz Power PC processor and within 1 GB of memory. VFNG includes the following unique key capabilities, Grammar Development, Dictionary Development, Automated Batch Grammar Testing, Grammar Coverage Query, Phonetic Distance Analysis, and Co-articulation Handling, Command Based Confidence Algorithm, Accent Tolerability Handling, State Based Dynamic Grammar, and Clipped Audio Recovery Processing. VFNG incorporates proprietary Julius based grammar and vocabulary of advanced performance and reduced recognition error together with an acoustic model derived from the VoxForge acoustic model. The VFNG-Emergency Failures (VFNG-E) system is used as the sole human/machine interface in flight in real emergency situations, in addition to the system having applications for simulator and ground training. This training system is remarkable in that it achieves very high recognition rates (98%) with a very large command set (131,000 unique words and thousands of word combinations) in challenging environmental conditions and operator profiles providing much added safety and efficiency to the pilot in the cockpit.

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Southern Air Aviation, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Continued on following page.

Small Business Innovation Research/Small Business Tech Transfer

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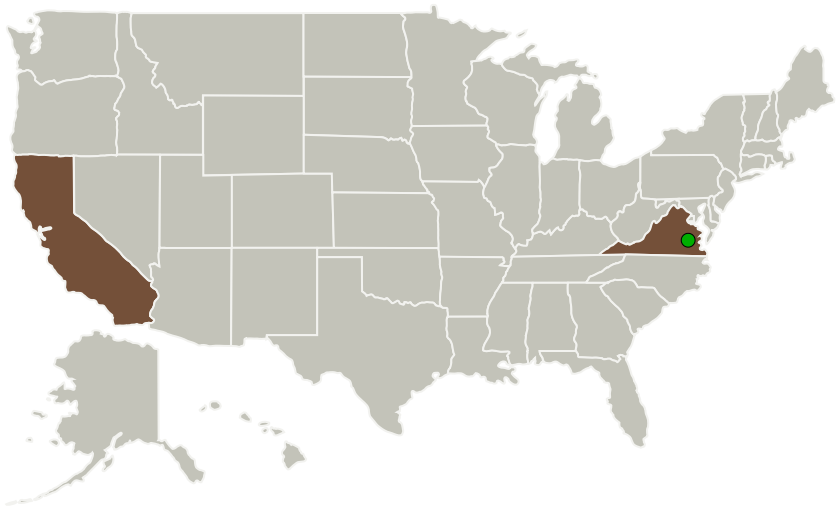
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Southern Air Aviation, Inc.	Lead Organization	Industry	Carlsbad, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140692)*

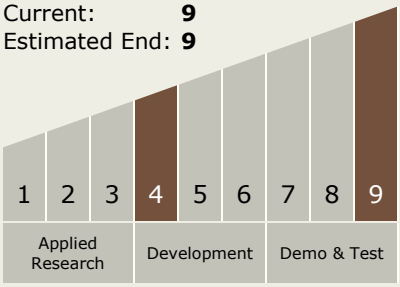
Project Management *(cont.)*

Principal Investigator:

Doinita Serban

Technology Maturity (TRL)

Start: **4**
Current: **9**
Estimated End: **9**



Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.3 Traffic Management Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System

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Images

Project Image
Voice Activated Cockpit Management Systems: Voice-Flight NexGen
(https://techport.nasa.gov/image/136329)